

Healthcare Personnel Immunization Recommendations

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Where do U.S. immunization recommendations come from?

Advisory Committee on Immunization Practices (ACIP)

- 15 experts selected by the U.S. Secretary of HHS to provide advice and guidance to CDC on the control of vaccine preventable diseases; the only entity in the federal government that makes such recommendations
- Develops written recommendations for routine administration of vaccines to children and adults in the civilian population; recommendations include age for vaccine administration, number of doses/dosing intervals, and precautions and contraindications

ACIP Recommended Immunizations for U.S. Healthcare Personnel (HCP)

- Hepatitis B vaccine
- MMR (measles, mumps, and rubella) vaccine
- Varicella vaccine
- Influenza vaccine
- Tdap (tetanus, diphtheria, and acellular pertussis) vaccine
- Meningococcal vaccine*

* Give 1 dose to microbiologists who are routinely exposed to isolates of *N. meningitidis*

<http://www.cdc.gov/vaccines/spec-grps/hcw.htm>


CDC Definition of Healthcare Personnel


- All paid and unpaid persons working in healthcare settings who have the potential for exposure to patients with influenza, infectious materials, including body substances, contaminated medical supplies and equipment, or contaminated environmental surfaces.
- HCP might include (but are not limited to):
 - physicians, nurses, nursing assistants, therapists, technicians, emergency medical service personnel, dental personnel, pharmacists, laboratory personnel, autopsy personnel, students and trainees, contractual staff not employed by the health-care facility, and persons (e.g., clerical, dietary, housekeeping, maintenance, and volunteers) not directly involved in patient care but potentially exposed to infectious agents that can be transmitted to and from HCP


Figure 2. Vaccines that might be indicated for adults based on medical and other indications

INDICATION ▶	Pregnancy	Immuno-compromising conditions (excluding human immunodeficiency virus (HIV)) ^{1,2,3}	HIV Infection ^{4,5,6,7}		Diabetes, heart disease, chronic lung disease, chronic alcoholism	Asplenia ⁸ (Including elective splenectomy and persistent complement deficiencies)	Chronic liver disease	Kidney failure, end-stage renal disease, receipt of hemodialysis	Health-care personnel
			CD4+ T lymphocyte count <200 cells/pL	≥200 cells/pL					
Tetanus, diphtheria, pertussis (Td/Tdap) ^{1,*}	Td	Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs							
Human papillomavirus (HPV) ^{2,*}		3 doses for females through age 26 yrs							
Varicella ^{3,*}	Contraindicated	2 doses							
Zoster ⁴	Contraindicated	1 dose							
Measles, mumps, rubella (MMR) ^{5,*}	Contraindicated	1 or 2 doses							
Influenza ^{6,*}	1 dose TIV annually								1 dose LAIV annually
Pneumococcal (polysaccharide) ^{7,9}	1 or 2 doses								
Hepatitis A ¹⁰	2 doses								
Hepatitis B ^{11,*}	3 doses								
Meningococcal ^{12,*}	1 or more doses								

*Covered by the Vaccine Injury Compensation Program.

 For all persons in this category who meet the age requirements and who lack evidence of immunity (e.g., lack documentation of vaccination or have no evidence of prior infection)

 Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications)

 No recommendation

These schedules indicate the recommended age groups and medical indications for which administration of currently licensed vaccines is commonly indicated for adults ages 19 years and older, as of January 1, 2010. Licensed combination vaccines may be used whenever any components of the combination are indicated and when the vaccine's other components are not contraindicated. For detailed recommendations on all vaccines, including those used primarily for travelers or that are issued during the year, consult the manufacturers' package inserts and the complete statements from the Advisory Committee on Immunization Practices (www.cdc.gov/vaccines/pubs/acip-list.htm).

CE090814

The recommendations in this schedule were approved by the Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP), the American Academy of Family Physicians (AAFP), the American College of Obstetricians and Gynecologists (ACOG), and the American College of Physicians (ACP).



DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION



2010 ACIP adult immunization recommendations

<http://www.cdc.gov/vaccines/recs/schedules/downloads/adult/2010/adult-schedule.pdf>



Required Immunizations for California Healthcare Personnel

- There are no federal or California state requirements for vaccination
- Facilities may require vaccinations as a condition of employment

State immunization laws for HCP and patients

<http://www2a.cdc.gov/nip/StateVaccApp/statevaccsApp/default.asp>

Vaccine that is required to be offered* per the Cal/OSHA Bloodborne Pathogen standard

- Hepatitis B vaccine – three doses

* To all employees who are exposed to blood or other potentially infectious materials as part of their job duties. If vaccine is declined, a declination form must be signed.

Vaccines that are required to be offered* per the Cal/OSHA Aerosol Transmissible Disease (ATD) standard as of September 1, 2010

Vaccine

- Influenza†
- Measles
- Mumps
- Rubella
- Tetanus, diphtheria, and acellular pertussis (Tdap)
- Varicella-zoster (VZV)

Schedule

- One dose annually
- Two doses
- Two doses
- One dose
- One dose, booster as recommended
- Two doses

* To all susceptible employees who might be exposed.
If vaccine is declined, a declination form must be signed.
† Seasonal vaccine was required to be offered in 2009.

Diseases covered by the ATD standard

- Applies to diseases classified by CDC's Healthcare Infection Control Advisory Committee (HICPAC) as having either droplet or airborne transmission*
 - Novel or unknown pathogens considered airborne
 - Only "reportable diseases" under Title 17† require exposure investigation

* 2007 Guideline for Isolation Precautions:
Preventing Transmission of Infectious Agents in Healthcare Settings
<http://www.cdc.gov/hicpac/2007IP/2007isolationPrecautions.html>

† http://www.cdph.ca.gov/HealthInfo/Documents/Reportable_Diseases_Conditions.pdf

Work settings covered by the ATD standard

- Applies in health care settings, such as:
 - Hospitals
 - Long-term care
 - Primary care
 - Emergency medical
- Applies in other high risk environments
 - Corrections
 - Homeless shelters
 - Drug treatment programs
 - First receivers
 - Laboratories

Which employees are covered?

- Exposure from work activity or working conditions that is reasonably anticipated to create an elevated risk of contracting any disease caused by aerosol-transmissible pathogens if protective measures are not in place
- “Elevated” risk means higher than what is considered ordinary for employees having direct contact with the general public outside of the facilities, service categories, and operations listed in the standard

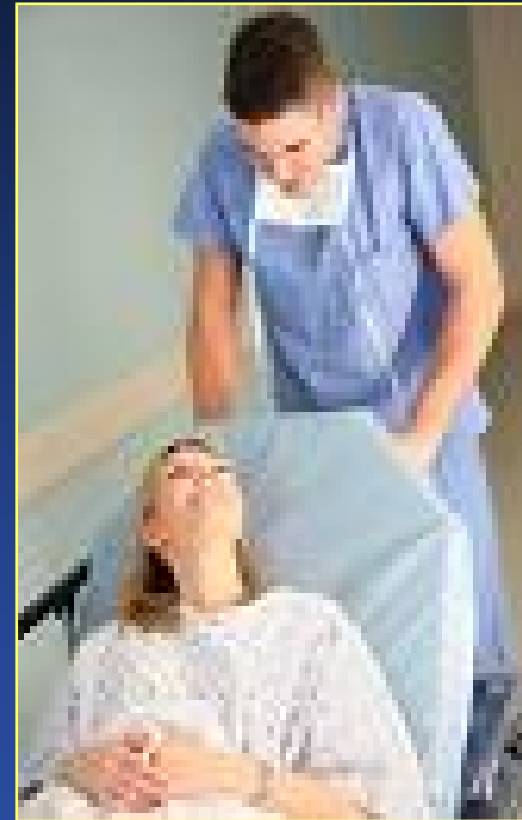
<http://www.dir.ca.gov/Title8/5199.html>

Occupational Exposure

- In each included work setting covered by the standard, it is presumed that some employees have occupational exposure; for a particular employee it depends on tasks, activities, and the environment
- Includes having contact with, or being within exposure range of cases or suspected cases of aerosol-transmissible diseases
- Employers must identify employees with occupational exposure in order to take protective measures

Examples of Possible Occupational Exposures

- Intake or triage of patients
- Providing care to influenza patients
- Testing people for TB
- Taking a throat swab for strep
- Cleaning patient rooms
- Transporting patients



Influenza Vaccine

Annual HCP Influenza Vaccination

- Offer to all eligible HCP at no cost
- Educate HCP about vaccination benefits and consequences of influenza illness for themselves *and their patients*
- Obtain signed declination forms
- Monitor coverage including ward, unit, and specialty-specific coverage rates
- Years of efforts to increase uptake have not increased rates significantly in most facilities
- **mandate vaccination??**

Barriers to HCP Vaccination

- Fear of vaccine side effects (particularly influenza-like illness symptoms)
- Perceived ineffectiveness of the vaccine
- Medical contraindication (not always valid)
- Perceived low likelihood of contracting influenza
- Fear of needles
- Insufficient time or inconvenience

Mandatory Vaccination

- Seattle: Virginia Mason – first U.S. hospital to mandate influenza vaccination or mask wearing during influenza season
- St. Louis: Barnes-Jewish – first U.S. hospital to mandate influenza vaccination and terminate noncompliant employees
- New York: 2009 emergency regulation (subsequently withdrawn) required seasonal and pandemic H1N1 vaccination of personnel in hospitals, home care, hospice, and diagnostic/treatment facilities
 - http://www.health.state.ny.us/diseases/communicable/influenza/seasonal/providers/2009-08-26_health_care_worker_mandatory_influenza_immunization.htm
- California: hospitals must offer vaccine at no cost to employees
 - Vaccination or written declination required per SB 739
 - Public reporting of vaccination rates via CDC's National Healthcare Safety Network (NHSN) required
 - Some hospitals mandated vaccination or mask wearing in 2009



National Organization Influenza Vaccination Recommendations

- IDSA 2009
 - Mandatory vaccination or mask wearing
- APIC 2008
 - Supports requiring influenza immunization for all HCP who have direct patient contact
 - Also recommends that healthcare facilities obtain informed statements acknowledging the risk to patients from employees who decline the vaccine for other than medical reasons
- ACIP 2007
 - Level of vaccination coverage among HCP to be one measure of a patient safety quality program
 - Implement policies to encourage HCP vaccination (e.g., obtaining signed statements from HCP who decline influenza vaccination)
- SHEA 2005
 - Vaccination or declination
- Most unions oppose mandatory vaccination

Joint Commission

Standard IC.02.04.01: The organization offers vaccination against influenza to licensed independent practitioners and staff.

1. The hospital establishes an annual influenza vaccination program that is offered to licensed independent practitioners and staff.
2. The hospital educates licensed independent practitioners and staff about, at a minimum, the influenza vaccine; non-vaccine control and prevention measures; and the diagnosis, transmission, and impact of influenza.
3. The hospital provides influenza vaccination at sites accessible to licensed independent practitioners and staff.
4. The hospital annually evaluates vaccination rates and the reasons given for declining the influenza vaccination.
5. The hospital takes steps to increase influenza vaccination rates.

Hepatitis B

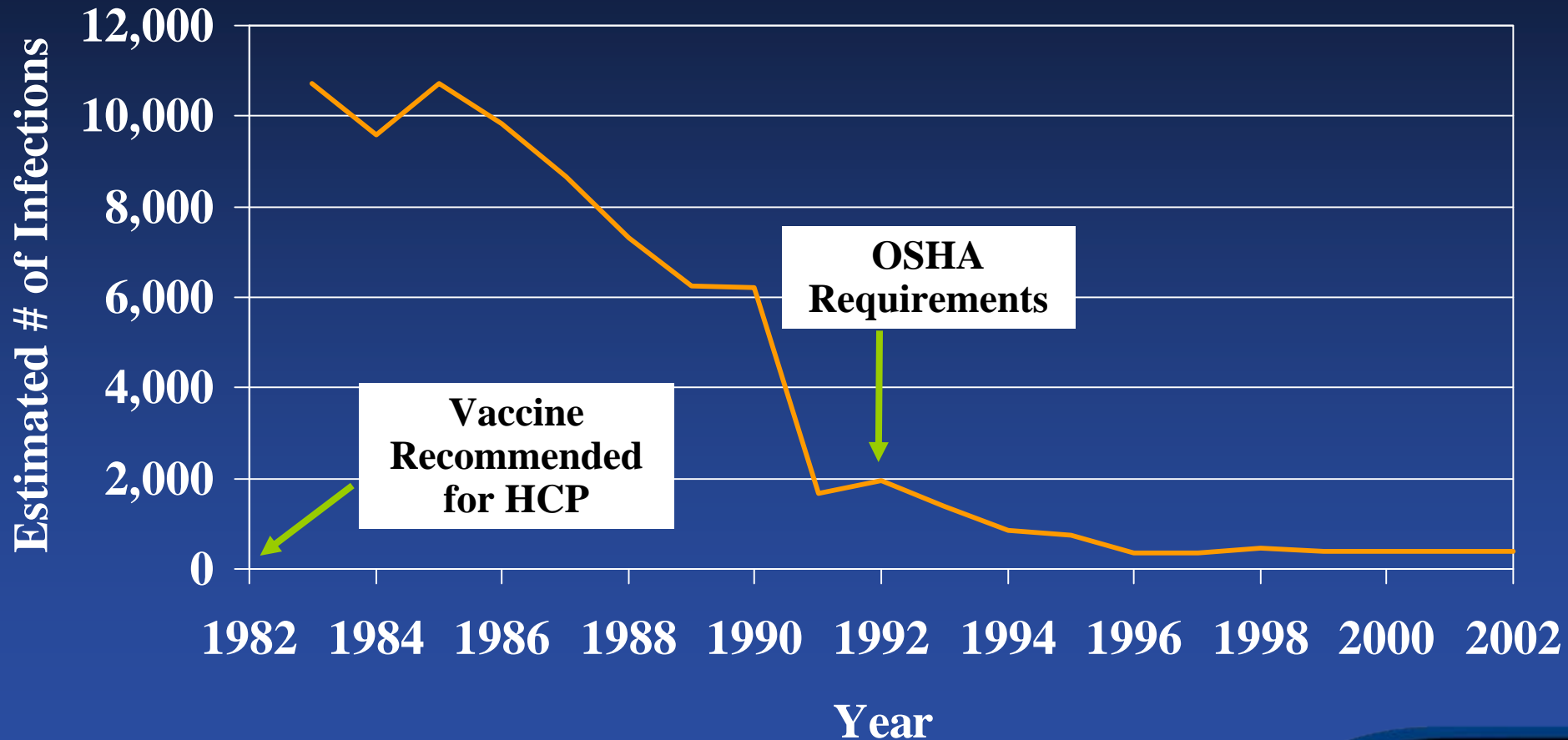
Hepatitis B Vaccination

- Any person who performs tasks involving contact with blood, blood contaminated body fluids, other body fluids, or sharps should be vaccinated against hepatitis B
 - Highly immunogenic – seroconversion ~95%
- Incidence among HCP since mid-1990s is lower than general population due to vaccination and standard precautions

Updated U.S. P.H.S. Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Post-exposure Prophylaxis. MMWR 50 (RR11) - 6/29/01

<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5011a1.htm>

Estimated Number of Acute HBV Infections Due to Occupational Exposures, United States, 1983-2002



Hepatitis B

- HCP with potential for exposure to blood or body fluids should be vaccinated for hepatitis B with 3-dose vaccine series
- Test HCP 1-2 months after last dose of vaccine series to determine if immune
- Persons with written documentation of complete vaccine series but without postvaccination testing do not need immunity testing unless they have an exposure to blood or body fluids
- Periodic titers or booster doses of vaccine not recommended - protection is long lasting

Measles



Measles Transmission

- Measles is transmitted via the airborne route and is thought to be the most infectious communicable disease
- Indigenous transmission of measles in the U.S. was declared eliminated in 2000; concern over recent imported cases
- Measles transmission has been documented in physician offices, emergency rooms, and hospital wards and HCP have been infected in recent outbreaks
- Good documentation and high levels of immunity minimize the amount of work that needs to be done in the event of an exposure
 - Record review for hundreds to thousands staff
 - Serologic testing and vaccination

Presumptive Evidence of Immunity to Measles

- Documented administration of two doses of live measles virus vaccine on or after the first birthday and at least 28 days apart; *or*
- Laboratory evidence of immunity or laboratory confirmation of disease; *or*
- Birth before 1957*

Documentation of physician-diagnosed measles is no longer acceptable evidence of immunity

* Since ~ 5% of people born before 1957 are susceptible to measles, CDPH recommends that immunity be assessed if such HCP are exposed to measles; during an outbreak, 2 doses of MMR are recommended for unvaccinated HCP without evidence of immunity

MMR Vaccination for HCP Born Before 1957

- HCP born before 1957 are generally presumed to be immune to measles, mumps, and rubella, but not all are
- Healthcare facilities should consider recommending 2 doses of MMR vaccine routinely for unvaccinated HCP born before 1957 who do not have laboratory evidence of disease or immunity to measles, mumps, and/or rubella
- For these same HCP who do not have evidence of immunity, healthcare facilities should recommend 2 doses of MMR vaccine during an outbreak of measles or mumps and 1 dose during an outbreak of rubella

Mumps



Presumptive Evidence of Immunity to Mumps

- Documented administration of two doses of live mumps virus vaccine on or after the first birthday and at least 28 days apart; *or*
- Laboratory evidence of immunity or laboratory confirmation of disease; *or*
- Born before 1957*

Documentation of physician-diagnosed mumps is no longer acceptable evidence of immunity

* During an outbreak, 2 doses of MMR are recommended for unvaccinated

HCP without evidence of immunity

Nosocomial Transmission of Measles and Mumps in Healthcare Facilities

- During 2001-8, 27 reported measles cases were transmitted in healthcare settings, accounting for 5% of all reported U.S. measles cases (*CDC, unpublished data*)
 - In 2008, 11% of cases; considerable economic cost and public health effort to contain (~\$100,000 to \$400,000)
- In Arizona in 2008, the largest nosocomial U.S. measles outbreak (14 cases) occurred in 20 years
 - At 3 hospitals, almost 8000 HCP were exposed; 25% had no documentation of immunity so were serologically tested
 - 30% were born before 1957 (5% susceptible)
 - 70% born >1957 (11% susceptible)
- In Tennessee in 1986-87, nosocomial transmission of mumps occurred in 2 hospital ERs infecting 6 HCP and in 2 long-term care facilities infecting 9 patients

Rubella



Presumptive Evidence of Immunity to Rubella

- Documented administration of one dose of live rubella virus vaccine; *or*
- Laboratory evidence of immunity* or laboratory confirmation of disease; *or*
- Born before 1957** (except premenopausal women who could become pregnant)

* HCP who can provide documentation of serological evidence of rubella immunity (e.g., via past prenatal testing) do not need to be retested and should be considered immune

** During an outbreak, 1 dose of MMR recommended for unvaccinated HCP without evidence of immunity

Varicella



Varicella Among HCP

- Nosocomial transmission of varicella is well-recognized
- Sources
 - Patients, hospital staff, and visitors with varicella or herpes zoster
- Airborne transmission of varicella has been demonstrated
 - Varicella has occurred in susceptible persons who had no direct contact with index case-patient
 - Virus detected in air

Evidence of Immunity to Varicella in HCP

- Documentation of two doses of vaccine given at least 28 days apart; or
- Laboratory evidence of immunity or laboratory confirmation of disease; or
- Diagnosis or verification of history of varicella disease by a healthcare provider; or
- Diagnosis or verification of a history of herpes zoster (shingles) by a healthcare provider

2007 ACIP Recommendations

- Serologic screening before vaccination
 - Testing unvaccinated HCP with a negative or uncertain history of varicella is likely to be cost-effective; or
 - Test all HCP, because small proportion with positive history of disease might be susceptible
- Routine testing after 2 doses of vaccine is not recommended
 - Available commercial assays not sensitive enough
 - In sensitive tests, 99% of adults develop antibodies after 2nd dose

<http://www.cdc.gov/mmwr/pdf/rr/rr5604.pdf>

Pertussis



Pertussis in the United States

- Least well controlled vaccine preventable disease
- It is cyclical; 2005 was the last peak year and increases in the first quarter of 2010 are concerning
- Most severe disease occurs among infants <6 months of age; almost all deaths occur in infants <3 months
- Immunity via vaccine or disease wanes over time; most children last vaccinated at kindergarten are susceptible by middle school
- Studies have shown that ~ half of the infants with pertussis were infected by a household member, most often their mother
- Documented transmission in healthcare facilities

Costs of Controlling Pertussis in Healthcare Facilities

- \$74,870-\$174,327 per outbreak
- \$42,000-\$98,000/year for pertussis exposures
 - Costs include identifying contacts among HCP and patients, providing postexposure prophylaxis for asymptomatic close contacts, and evaluating, treating, and placing symptomatic HCP on administrative leave until they have received effective treatment

MMWR December 15, 2006;55(RR17)
<http://www.cdc.gov/mmwr/PDF/rr/rr5517.pdf>

Tdap Vaccine and HCP

- In 2005, a vaccine containing tetanus and diphtheria toxoids and acellular pertussis vaccine (Tdap) was licensed in the U.S. for persons aged 11-64 years (ADACEL®)
- In 2006, ACIP recommended that HCP in hospitals or ambulatory care settings with direct patient contact receive Tdap as soon as feasible if they had not previously received it
- Although recommended for all HCP with patient contact, HCP who have direct contact with infants 12 months of age and younger should be strongly encouraged to be vaccinated

<http://www.cdc.gov/mmwr/PDF/rr/rr5517.pdf>

Implementing Hospital Tdap Program

- Infrastructure for vaccination exists in most hospitals
 - New personnel screened and vaccinated on employment
 - Can be given at same time as influenza vaccine
 - A booster dose is likely to be recommended in the future
- **In addition, birth hospitals are encouraged to promote postpartum Tdap vaccination of new mothers to protect young infants**

Most Recent ACIP Recommendations

Healthcare workers, 1997 (update in 2010?)

<http://www.cdc.gov/mmwr/preview/mmwrhtml/00050577.htm>

Hepatitis B, 2006

<http://www.cdc.gov/mmwr/PDF/rr/rr5516.pdf>

Influenza, 2009

<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr58e0724a1.htm>

Influenza healthcare workers, 2006

<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5502a1.htm>

Diphtheria, tetanus, pertussis, 2006

<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5517a1.htm>

Measles, mumps, rubella, 1998 and 2009 update

<http://www.cdc.gov/mmwr/preview/mmwrhtml/00053391.htm>

<http://www.cdc.gov/vaccines/recs/provisional/downloads/mmr-evidence-immunity-Aug2009-508.pdf>

Mumps, 2006

<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5522a4.htm>

Varicella, 2007

<http://www.cdc.gov/mmwr/pdf/rr/rr5604.pdf>